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August 25, 2016

Via ECFS

Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte* Filing of the American Cable Association on Expanding Consumers' Video Navigation Choices, MB Docket No. 16-42, and Commercial Availability of Navigation Devices, CS Docket No. 97-80

Dear Ms. Dortch:

On August 23, 2016, Ross Lieberman, Senior Vice President of Government Affairs, and Mary Lovejoy, Vice President of Regulatory Affairs, American Cable Association ("ACA"), Micah Sachs, Cecilia Tai, and Ryan Fugate, Cartesian, Consultant to ACA (by telephone), Barbara Esbin, Cinnamon Mueller, Counsel to ACA, and Thomas Cohen, Kelley Drye & Warren LLP, Counsel to ACA, met with Gigi Sohn, Counselor to Chairman Wheeler, Jessica Almond, Legal Advisor, Media, Public Safety, and Enforcement to Chairman Wheeler, Eric Feigenbaum, Office of Media Relations, and John Williams, Office of General Counsel. On August 24, 2016, Ross Lieberman, Micah Sachs and Cecilia Tai (by telephone), and Thomas Cohen met with Michelle Carey, Brendan Murray, and Ikenna Ofobike from the Media Bureau. The purpose of the meetings was to provide greater data and information about the steps and associated costs required for smaller multichannel video programming distributors ("MVPDs") to offer their existing video service in Internet Protocol ("IP") through adaptive bitrate multicast or unicast streams ("all-IP") – a prerequiste to implementing either the Commission's initial proposal, the NCTA/AT&T "Apps" proposal, or any proposal derivative of either.

ACA representatives opened the meetings by explaining that for any navigation device solution to be workable and effective for smaller MVPDs and their customers, it needs to reflect the realities of the video market and their business. First, smaller MVPDs, while numerous,

serve only about seven percent of pay-TV customers.[1] Second, for smaller MVPDs, the pay-TV business model is increasingly tenuous. Their cost of content continues to increase at 10 percent annually[2] while they are limiting retail rate increases to four percent annually.[3] As a result, video margins have declined from 2012 to 2015 from 22 percent to 13 percent,[4] and, this trend is expected to continue. In addition, consumers are cutting the cord, reducing the number of pay-TV subscribers for smaller MVPDs by about six percent annually.[5]

Because their pay-TV business is more tenuous, smaller MVPDs are limiting investments in their MVPD service and investing primarily to increase the capability and performance of their broadband services, which especially benefit subscribers that consume video from over-the-top ("OTT") providers. These "OTT video-enhancing" broadband investments include:

- network plant upgrades (*e.g.* plant capacity upgrades, freeing up QAMs by migrating pay-TV service offerings still provided in analog to digital, increasing QAM channels for DOCSIS);
- joining OTT provider caching programs to optimize the OTT viewing experience (to the extent MVPDs can meet the OTT providers' minimum requirements to participate);[6] and

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1 *See* SNL Kagan, "Multichannel Top Cable MSOs Data," (Dec. 2015).

2 *See* Reply Comments of American Cable Association on the Notice of Inquiry of Immediate Action to Accelerate Deployment, GN Docket No. 14-126, Attachment – "High and Increasing Video Programming Fees Threaten Broadband Deployment," American Cable Association (filed Apr. 6, 2015).

3 Analysis of subscriber rates from ACA members ("ACA Subscriber Data").

4 *See* SNL Kagan, "Average Monthly Per-Sub Margins by Segment, Q1 '12 Through Q2 '16," (May 2016). These data are for all MVPDs. For smaller MVPDs, the margins are even slimmer due to higher per-subscriber programming costs and lack of scale across all operations.

5 ACA Subscriber Data.

6 *See* Letter from Barbara S. Esbin, Counsel, ACA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket Nos. 14-28, 10-127, at 4 (Feb. 2, 2015) ("CFU, JEA and Shentel have embraced facilitating over-the-top video viewing for their subscribers by entering into local caching arrangements with online video distributors such as Netflix and Amazon"); *see* Letter from Barbara S. Esbin, Counsel, ACA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket Nos. 14-28, 10-127, at 3 (Feb. 19, 2015) ("Mr. Gessner explained that MCTV had to chase Netflix down to discuss mutually beneficial settlement-free caching arrangements to improve Netflix's customers' Internet experience when it learned Netflix was offering them to some ISPs. It was only after MCTV increased its available capacity to a level that met Netflix's minimum requirements did Netflix permit MCTV to participate in its Open Connect program. Collocation of Netflix servers improved their

- deploying advanced set top boxes with cutting edge user interfaces (*e.g.* TiVo) that enable subscribers to access OTT content alongside their pay-TV service and permit the integrated search of their pay-TV and available OTT content.[7]

ACA representatives explained that because the pay-TV business is increasingly "unviable" for smaller MVPDs, these providers would welcome ways to reduce MVPD-related costs, including the significant costs associated with leasing set top boxes. Many smaller MVPDs use a sizeable percentage of their capital to purchase set top boxes,[8] which they then lease, and they receive little or no return on this investment.[9] As a result, they would be open to delivering their services over third party devices under the right circumstances to avoid the capital and operational costs of leasing devices. To the extent that there is a financially sound way for smaller MVPDs to minimize the total amount they spend on MVPD-related consumer premises equipment that also gives consumers more choice, smaller MVPDs would wholly embrace it. Unfortunately, such a solution does not exist in the market today.

The Commission appears to be considering whether to move forward with its original Infomation Flows approach, an "apps-based" solution,[10] or some proposal derivative of either.

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customer service experience immensely, which was expected given that Netflix alone accounts for 40% of MCTV's peak Internet traffic. Easton Utilities, with 6,000 Internet subscribers, has never even contemplated asking Netflix to collocate, believing that getting Netflix's attention would be futile."). *See* Netflix Open Connect, Network and data center criteria, *available at* https://openconnect.netflix.com/en/requirements-for-deploying/ (last visited August 25, 2016).

7 *See* Comments of ACA, MB Docket No. 16-42, CS Docket No. 97-80, 16-39 (Apr. 22, 2016) ("ACA Comments") (describing smaller MVPD initiatives to partner with OTT providers and provide their subscribers with access to OTT content alongside their pay-TV service through the deployment of innovative set-top boxes).

8 In the first quarter of 2016, the top seven cable operators dedicated 45 percent of their total cap expenditures to customer premise equipment, the majority of which is set top boxes. *See* SNL Kagan, "Cable Q1 '16 CapEx Jumps 10%," *available at* https://www.snl.com/InteractiveX/article.aspx?ID=36727638 (subscription required, last visited August 25, 2016).

9 *See* ACA Comments at 26.

10 An "apps-based" approach has been proposed by the larger MVPDs. *See, e.g.*, Letter from Paul Glist, Davis Wright Tremaine LLP, to Marlene H. Dortch, Secretary, Federal Communications Commission, MB Docket 16-42, CS Docket No. 97-80 (June 16, 2016). A recent filing by programmers stated that the Commission is now considering an "apps-based" solution. *See* Letter from Jared S. Sher, Senior Vice President and Associate General Counsel, 21st Century Fox, to Marlene H. Dortch, Secretary, Federal Communications Commission, MB Docket 16-42, CS Docket No. 97-80, at 1 (Aug. 17, 2016) ("The Commission representatives indicated that they are seriously considering a

Both the original and "apps-based" approaches will depend on MVPDs offering their video in IP through adaptive bitrate multicast or unicast streams ("all-IP"),[11] due to the absence of any

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revised approach to this proceeding that would ensure that all of programmers' valuable content would remain inside of, and under the control of, apps developed exclusively by multichannel video programming distributors (MVPDs) with whom programmers have a direct contractual relationship.").

Prior to pursuing an "apps-based" solution, the Commission proposed its Information Flows approach. ACA has explained to the Commission that this proposal would be far too onerous for smaller MVPDs because the lowest cost means by which they could implement it would be through the installation on the customer's premises of QAM/IP gateways, at a cost of approximately $350 per gateway. However, while there are gateways on the market, they have limited capability and are not compliant with the Commission's proposal. In addition to the cost of these gateways, ACA estimated that MVPDs would need to spend approximately $1 million per system to comply with the Commission's proposal (to the extent costs are known). These costs include security system costs and testing and systems integration costs. Moreover, if the larger MVPDs would comply with any new navigation device rules by going all-IP, which is likely given that would be the means of complying with their "apps-based" solution, as a practical manner, ACA's lower cost gateway solution will not be developed by vendors and not available for smaller MVPDs to use. *See, e.g.*, ACA Comments at 2, 52-54; Reply Comments of the American Cable Association, MB Docket No. 16-42, CS Docket No. 97-80 at 3-8 (May 23, 2016).

See also Letter from Thomas Cohen, Counsel to the American Cable Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, WC Docket No. 16-42 *et al.* (July 12, 2016). In this submission, ACA estimated that the "apps-based" solution would require larger MPVDs "to expend upwards of approximately $2 million per system to implement." The costs to simulcast in all-IP, which are discussed herein, are in addition to that amount and account for the substantial plant upgrades and headend consolidation that would be necessary for such simulcasting.

[11] Unicast IP video streaming refers to the situation where an individual user requests a stream and that user alone receives the stream, which is how Netflix works today. Multicast IP video streaming refers to the situation where an individual user requests a stream and at the point the individual requests the stream, it becomes available to other users in the service group, which is how most IPTV systems work today. There are differing perspectives among providers on whether the best approach to implement all-IP and the set top box proposals would be using multicast IP video streams or unicast IP video streams. These decisions are contingent upon a variety of factors, including the requirements of the set top box proposal, existing system capacity, and assumptions about expected uptake and attitudes toward expected technological evolution of third-party platforms. At scale, multicast IP video streaming is more efficient in managing shared bandwidth on a hybrid-fiber coax system, but multicast IP video streaming is not currently available on all third-party platforms and devices. The cost and capacity upgrades required, however, will not differ significantly, at least over the four-year

technology options relied upon or expected to be relied now or in the future that can enable traditional RF video to be transmitted to third party devices and apps in a secure manner. These all-IP streams for practical purposes will be simulcast along with their digital video for many years because nearly all subscribers of smaller MVPDs receive video service over set top boxes or televisions with QAM turners that are only capable of receiving signals in a QAM format. MVPDs simulcasting their service in all-IP therefore could not discontinue their QAM service (or RF video) without cutting off service to customers, and they would need to continue offering video service in both legacy RF and in all-IP until all customers are using devices capable of receiving their service in all-IP.[12]

Simulcasting in RF and all-IP video, however, requires large amounts of bandwidth and major investments in increasing the capacity of their existing networks to provide that bandwidth.[13] The larger MVPDs, some of whom who started implementing plans to simulcast their service in all-IP years ago,[14] in proposing their "apps-based" solution, commit to simulcasting in all-IP in two years, but they have explicitly stated their solution should not apply to smaller MVPDs (those with fewer than 1 million subcribers). There is good reason for this distinction.

Unlike larger operators, very few smaller cable operators have started implementing, or begun planning to simulcast in all-IP. First, smaller MVPDs are not certain that all-IP video delivery will lead to greater profitability, either via operating efficiencies, increased revenues, or reduced churn.[15] Second, smaller MVPDs have determined that transitioning to all-IP will be

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period of ACA's cost estimates. ACA's estimates for necessary additional capacity are applicable to either unicast or multicast environments.

12 After a two decade long transition, most smaller MVPDs today offer video programming using digital video delivery technology, although many still simulcast at least some of their linear video services in analog for customers that prefer not to have a set top box for a second or third television.

13 The investments required to simulcast IP-video are in addition to investments required to increase bandwidth for the provision of broadband services.

14 *See* Mari Silby, "Comcast: All-IP Video Target is Q1," LightReading (Oct. 24, 2015), *available at* http://www.lightreading.com/video/multi-screen-video/comcast-all-ip-video-target-is-q1/d/d-id/718748; Mari Silbey, "TWC Steps Toward All-IP TV," (Oct. 29, 2015), *available at* http://www.lightreading.com/video/video-services/twc-steps-toward-all-ip-tv/d/d-id/719018?itc=lrnewsletter_cabledaily

15 Some smaller MVPDs have noted that long term benefits of going all-IP may include network resiliency, ease of maintenance and other operating expense savings, and ability to offer video service across platforms and devices which may be important to remain competitive in the market.

very costly and time-consuming to implement.[16] In sum, given current market conditions, especially declining demand and margins for pay-TV, smaller MVPDs in general are at best uncertain about whether there is or ever will be a viable business case for them to simulcast video in all-IP.[17]

Requirements and Costs for Smaller MVPDs to Move to All-IP Video Delivery

Simulcasting in all-IP involves completing a number of capital intensive and operationally complex "gating" requirements. These include – ensuring the network has sufficient bandwidth, completing the transition of MVPD services to all digital, consolidating or otherwise interconnecting headends, and procuring IP transcoding equipment for national programming, VOD, and local programming. Below, ACA explains in detail the factors that smaller MVPDs must consider regarding simulcasting in all-IP, including the costs and other material issues. (*See also* the attached presentation.)

Over the past month, ACA held lengthy discussions with smaller MVPDs about the process they need to undertake and the costs they will incur to simulcast in all-IP. Before even considering the substantial investment in equipment required to deliver video in all IP, every cable operator began by explaining that they first face a critical threshold question: since I will need to continue offering video service in digital for many years and upgrade my network to increase broadband capability and performance, how do I ensure my system has sufficient "free" bandwidth to simulcast all-IP without harming customers either by providing an unreliable all-IP video stream or by slowing broadband speeds?[18]

ACA members indicate that the minimum last-mile channel capacity for all their systems will have to be 750 MHz. ACA has determined from discussions with its members that almost all of their systems will require capacity upgrades to attain the required bandwidth.[19] Upgrading

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16 Because deploying IP requires so many network and operational changes, each MVPD's transition will be different and will be driven by different factors, including the provider's scale, network capability, competition, customer demographic, access to transport, and overall resources.

17 In addition, smaller MVPDs already have a full slate of "must do" investment projects, particularly to upgrade their broadband networks to respond to exploding customer demand.

18 Estimates from ACA members suggest 13-16 free DOCSIS channels (78 to 96 MHz) would be necessary to support IP video delivery at scale.

19 ACA examined the systems of cable operators with 1 million subscribers or fewer and found that 15 percent of these systems have less than 750 MHz of channel capacity. Most rural systems, about 25 percent of suburban systems, and about 5 percent of urban systems have less than 750 MHz of channel capacity. Many ACA members indicated that having a system with more than 1 GHz of activated channel capacity is preferable

plant capacity is a costly, time-consuming endeavor, requiring the installation of amplifiers to amplify the RF signal in the last-mile coax network in systems operating under 750 MHz. Operators also expect they will need to reclaim all of their analog channels to free up additional capacity. While analog reclamation itself does not incur additional head-end costs if the analog stations are already simulcast in digital video, practically, operators will need to provide digital television adapters (DTAs) to all customers who cannot receive digital video on their televisions or choose not to use a set-top box.

Once additional free bandwidth is made available via channel capacity upgrades and analog reclamation, operators will need to deploy additional equipment to add QAM channels to enable all-IP video transport over DOCSIS. To ensure quality of service, operators expect to reserve these QAM channels only for all-IP video transport so they are not competing with other end-user bandwidth demands (i.e., broadband). Operators indicate they will additionally need to reduce the size of larger service groups on nodes in their network to ensure the dedicated QAM channels for all-IP video can serve anticipated demand from end-users. To do so, they will need to split nodes, which typically entails building more fiber to place an additional node closer to half of the homes in the service group.[20]

The costs for these plant upgrades are substantial. ACA estimates that to reclaim analog channels for DOCSIS bandwidth, smaller operators will need to deploy DTAs at a cost of approximately $56 per subscriber receiving any analog service.[21] As for those systems that need to be upgraded to 750 MHz, for an average system, the cost will be approximately $4,000 per

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even after accounting for the "recapture" of QAMs by shutting down analog. These assumptions are based on the cable operators' delivery of their services to their customers in MPEG2. Some operators have begun transitioning to MPEG4, another costly transition, which upon completion, would free up additional bandwidth.

20 ACA estimates that rural and suburban systems will need to perform node splits across at least 20 percent of their footprint, and urban systems will need to perform node splits across at least 10 percent of their footprint. There are no general statistics on node sizes, but anecdotally ACA has heard from members that smaller operators may need to split the majority of their nodes. Smaller rural and suburban operators often have nodes serving a larger number of households than urban providers due to the longer distances between homes (which would lead to more expensive fiber builds to new nodes) and, in some cases, lower historical broadband demand.

21 To encourage subscribers to transition from analog to digital service, MVPDs regularly deploy DTAs free-of-charge to subscribers receiving analog service as part of the analog reclamation process. $56 is the all-in cost to MVPDs of providing free-of-charge DTAs and does not include any DTAs for which MVPDs receive rental fees from the subscriber. The $56 estimate includes $40 for the DTA, $11 for shipping and marketing and $95 for service call costs per DTA, assuming five percent of DTA users require installation from their MVPD.

hard coax plant mile to install new amplifiers. Furthermore, it will cost approximately $30,000 to split each node to reduce capacity demand. Lastly, the cost to deploy CMTS equipment to add QAM channels for DOCSIS is approximately $3,000 per node with ongoing support and maintenance fees of approximately 10 percent per year.[22]

For operators that operate multiple systems, there are additional upgrade costs. All-IP delivery can be provided most cost-effectively when systems are interconnected and headends are consolidated since the substantial fixed costs of all-IP headend equipment can be spread over a larger subscriber base. Accomplishing this task assumes that the MVPD can obtain sufficient transport capacity – at least redundant 1 Gbps transport and preferably 10 Gbps – at a reasonable cost. ACA estimates that a 10 Gbps link costs approximately $6,000 per month per system with an additional cost for transponders of approximately $15,000 per system per 10G wave. Where competitive transport is not available, which is often the case in areas served by rural systems, it may be cost-prohibitive to undertake consolidation. ACA estimates the cost to build fiber is approximately $250,000 per system assuming a five mile build to the closest point of presence with an additional cost to purchase Dense Wavelength Division Multiplexing equipment at approximately $40,000 per system.[23]

In addition to these plant upgrades, MVPDs will need to install at least some and perhaps all of the following equipment that allows for an all-IP video simulcast:

- New all-IP master headend for linear (national and broadcast) content, including IP transcoders, encryption, and IP routing:[24]
    - The cost of transcoding and encrypting national linear feeds in multiple formats is estimated to be $7,000 per linear feed per end-state master headend; with the average ACA member carrying approximately 300 national feeds, the cost will be $2,100,000 per headend.
    - The cost of transcoding and encrypting local channels in multiple formats is estimated to be $7,000 per channel; thus if there are 15 channels to carry in a DMA, which includes broadcast channels, including multicast where required via

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22 CMTS equipment performs channel bonding which is necessary to translate RF channels into DOCSIS channels used for broadband and IP video delivery. Because CMTS equipment is priced on a per-channel basis, MVPDs will incur additional CMTS equipment costs when adding DOCSIS channels for the delivery of IP video. CMTS equipment also performs traffic routing and device registration/configuration.

23 DWDM technology uses different wavelengths of light to multiplex carrier signals.

24 Redundant links are required to ensure service is sufficiently reliable.

contract, and Public, Educational, and Government channels, the cost will be $105,000 per DMA.[25]

- Storage hardware and transcoder for VOD content, which ACA estimates will cost $300,000 per headend;

- Content Delivery Network ("CDN") infrastructure (origin/end storage and optimization infrastructure) to optimize the delivery of content to internet-ready devices[26], which ACA estimates will cost $250,000 per headend for systems with fewer than 25,000 subscribers and $500,000 per headend for systems with more than 25,000 subscribers;[27]

- Metadata server to enable integrated search on third party apps and devices, which ACA estimates will require a one-time cost of $35,000 per operator;

- DRM licenses for third party devices streaming the IP video at a one-time costs of $2.50 per license; assuming an average of two third party devices are adopted by 20 percent of an MVPD's subscriber base, ACA estimates that DRM licenses will cost $1 per video subscriber;[28]

- Ongoing support and maintenance fees, which is standard on new headend equipment like transcoders and VOD systems, which ACA members report is roughly 10 percent of headend equipment cost per year; and

- New Ad-Insertion equipment.

Not only are the capital requirements of simulcasting in all-IP substantial, but smaller MVPDs will face considerable operational challenges. Simulcasting in all-IP will require

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25 Since many ACA members serve multiple DMAs, the costs to transcode local channels can be as much or more than the cost of transcoding national linear feeds.

26 CDN infrastructure caches content closer to subscribers to ensure transmissions are provided expeditiously, reliably, and with sufficient quality.

27 CDN infrastructure costs can continue to scale upwards with system size, with some MVPDs operating larger systems incurring CDN costs of $750,000 to $1.5 million.

28 ACA's cost estimate assumes that MVPDs will only need to license a single DRM platform. Actual DRM licensing costs are likely to be higher as MVPDs typically will need to license multiple DRMs to accommodate the heterogeneous security ecosystem for third-party devices. For example, Apple devices only support HLS and Fairplay, while many Android devices use Google Widevine.

See "Leading DRM Platforms," Encoding.com (2016), *available at* http://www.encoding.com/digital-rights-management-drm/.

MVPDs to devote substantial effort and human resources to product management, software development, video engineering, business planning, plant construction labor, and selecting vendors and negotiating programming agreements that today may limit operators' ability to transmit video in all-IP to any third-party device.[29] In addition, smaller MVPDs, which lack scale, may face particular challenges in deploying should there be a the lack of availability of fiber or other equipment[30] or plant construction vendors. Smaller MVPDs also would suffer disproportionately from higher prices and longer waiting times from suppliers.[31] Moreover, smaller MVPDs also typically do not have capital readily available to devote to a mandate of this magnitude, particularly in a short time frame, and are limited in their ability to secure financing from an outside source.[32]

Even after the plant upgrade and all-IP video costs and associated operational costs, smaller MVPDs would need to incur additional costs associated with any navigation device proposal for delivering video services to customers utilizing third party devices. Should the Commission adopt an "apps-based" solution, an MVPD will need to develop and maintain the app. ACA estimates the cost for all of these elements will be $100,000 to $500,000 per MVPD.

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29 ACA members have stated that a number of their programming contracts contain language and technical requirements which would contractually bar them from delivering a programmer's content over all-IP. These programming contracts would need to be renegotiated prior to simulcasting in all-IP, representing a time-consuming and non-trivial undertaking for smaller MVPDs, who generally lack the scale to motivate programmers to negotiate individual agreements with them.

30 There is currently a shortage of available fiber for construction of fiber networks in North America. *See* Sean Buckley, "Ting avoids fiber cabling shortage by striking direct supplier deals," FierceTelecom (Aug. 9, 2016), *available at* http://www.fiercetelecom.com/telecom/ting-avoided-fiber-cabling-shortage-by-striking-direct-supplier-deals.

31 *See* ACA Comments at 44, n.142 ("As a result of industry norm, smaller MVPDs often have to wait for new technologies and equipment to be made available for their systems … One ACA member, for instance, had to delay its all-digital transition because it took 15 months to receive a guide that was already available to larger MVPDs' set-top box models. The Commission has acknowledged this reality in the past, noting that 'large cable operators … generally dictate equipment features to manufacturers and commonly get priority in the delivery of that equipment'").

32 *See* ACA Comments at 56 ("While smaller MVPDs could attempt to secure financing from an outside source … they do so at relatively higher interest rates than their larger counterparts").

ACA estimates an information flows approach would incur costs similar to the costs of an "apps-based" solution.[33]

In sum, the costs to simulcast in all-IP are substantial, and they vary considerably among smaller MVPDs, based on many factors, including network bandwidth, scale, and proximity to reasonably priced transport. Moreover, these costs far exceed the costs that these MVPDs incurred complying with the FCC's 2007 set top box integration ban which was intended to ensure their support for consumers that sought to attach third party CableCARD enabled devices, where the costs were spread over many years, consistent with MVPDs' set top box refresh cycles. Further, these costs were sustained at a time when the pay-TV business was far more profitable.

To provide an indication of the range of costs that a smaller MVPD would incur to make the transition, ACA developed four hypothetical, but representative, examples of MVPD systems. These cases indicate that only MVPDs with more than 1,000,000 subscribers that have already upgraded their network bandwidth and interconnected their headends have the ability to transition to all-IP video delivery within the near future in an economically viable manner.

- Mid-sized urban MVPD: Total additional capital and operating costs of $30.2 million

  Select Assumptions:[34] 145,000 subscribers in 10 systems; Network Capacity – 4 percent of nodes have bandwidth below 750 MHz; No subscribers receiving analog service; Headend Consolidation has been completed; All IP related equipment installed in two headends; 2,466 nodes with 300 households passed per node; fiber is available for lease directly to all headends.

  Economic Impact of Transition to All-IP: Total capital costs are approximately $24.4 million and operating costs are approximately $5.8 million, which is 4.7 times the cost of compliance with the set-top box integration ban in 2007.[35]

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33 Although the costs of an "information flows-based" approach may be similar to the costs of an "apps-based" approach, ACA strongly believes an "apps-based" solution better serves the public interest.

34 *See* attached presentation for further details about assumptions.

35 To compare costs between the current proposals and the set-top box integration ban, ACA compared the four-year cost of the proposals, including ongoing operating expenses, with the four year expenditure required for the set-top box integration ban. For the set-top box integration ban, ACA used the incremental cost of separable security set-top boxes above set-top boxes without separable security, and assumed an average of one

- Mid-sized suburban/exurban multi-system MVPD: Total additional capital and operating cost of $58.9 million

  Select Assumptions: 213,000 subscribers in 32 systems of varying sizes and remoteness; Network Capacity – 27 percent of nodes have bandwidth below 750 MHz; 51,115 subscribers receiving analog service; Headend Consolidation has not been completed; All-IP related equipment installed in two headends after consolidation; 1,430 nodes with 500 households passed per node; fiber is available for lease directly to 80% of systems.

  Economic Impact of Transition to All-IP: Total capital costs are approximately $46.1 million and operating costs are $12.8 million, which is 6.2 times the cost of compliance with the set-top box integration ban in 2007.

- Small suburban MVPD: Total additional capital and operating costs of $17.5 million

  Select Assumptions: 53,000 subscribers in 5 systems; Network Capacity – 21 percent of systems have below 750 MHz of bandwidth; 12,720 subscribers receiving analog service; Headend Consolidation has not been completed ; All IP related equipment installed in two headends after consolidation; 292 nodes with 500 households passed per node; fiber is available for lease directly to 80% of systems.

  Economic Impact of Transition to All-IP: Total capital costs are approximately $13.4 million and operating costs are $4.1 million, which is 7.5 times the cost of compliance with the set-top box integration ban in 2007.

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digital set-top box per subscriber with a five-year set-top box replacement cycle. The incremental cost of a separable security set-top box is $56.

See "What You Need to Know About the Integration Ban," NCTA (Sept. 26, 2013) *available at* https://www.ncta.com/platform/public-policy/what-you-need-to-know-about-the-integration-ban/ ("By one estimate cited by the FCC, CableCARD technology adds approximately $56 to the cost of an operator's box").

See SNL Kagan, "Projected U.S. Digital Cable Households and Units Installed" (Sept. 22, 2009). Excluding DTA devices, there were 65.1 million digital set-top boxes installed across 64.3 million U.S. video subscribers in 2008, which is an average of 1.01 digital set-top boxes per video subscriber.

The five year set-top box lifecycle is based on the results of a survey of ACA members on their costs to provide set-top boxes to their subscribers.

- Small rural MVPD: Total additional capital and operating costs of $8.1 million with 15,500 subscribers in 2 systems

  Select Assumptions: 15,500 subscribers in 2 systems; Network Capacity – 50 percent of systems have below 750 MHz of bandwidth; 3,720 subscribers receiving analog service; Headend Consolidation has not been completed ; All IP related equipment installed in multiple headends; 85 nodes with 500 households passed per node; fiber is available for lease directly to 50 percent of systems.

  Economic Impact of Transition to All-IP: Total capital costs are approximately $6.5 million and operating costs are $1.7 million, which is 12 times the cost of compliance with the set-top box integration ban in 2007.

ACA continues to believe that the Commission should exempt smaller MVPDs (those with one million or fewer subscribers) from complying with any new navigation device rule. These smaller MVPDs do not control the pace of the transition to new techologies in the industry. In any event, they will be motivated to move to all-IP solutions adopted by larger MVPDs as deployment costs decrease and to compete with the offerings of these larger providers. Furthermore, these MVPDs have committed to continue supporting their customers' use of CableCARDs, and an increasing number of smaller MVPDs are deploying advanced set top boxes that allow their customers to receive OTT services alongside their linear services and conduct an integrated service. Finally, many of the smallest MVPDs have been and will continue to offer video programming in an unencrypted format, which allows their customers to receive their service without having to lease a set top box from the MVPD or otherwise pay to receive the service in this manner. According to ACA members, this service offering is very popular among both lower income and older customers.

This letter is being filed electronically pursuant to Section 1.1206 of the Commission's rules.

Sincerely,

Thomas Cohen
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3050 K Street N.W.
Washington, DC 20007
202-342-8518
tcohen@kelleydrye.com
Counsel for the American Cable Association

Attachment: Analysis of Financial and Operational Costs for Small and Mid-Sized MVPDs to Simulcast their Video Service in All-IP

cc: Gigi Sohn
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Analysis of Financial and Operational Costs for Small and Mid-Sized MVPDs to Simulcast their Video Service in All-IP

Simulcasting in All-IP would be a Prerequisite for any MVPD to Comply with Any New FCC Set Top Box Rules

Ex Parte Filing of the American Cable Association on Expanding Consumers' Video Navigation Choices, MB Docket No. 16-42, and Commercial Availability of Navigation Devices, CS Docket No. 97-80

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The Current State of the Small MVPD Video Market

ACA members are serving[a]

7%  *of US Pay-TV customers, 2016*

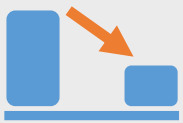
ACA member costs to obtain programming are increasing[b]

10% *annually*  *2013-2014*

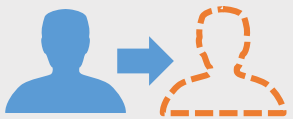
ACA member subscriber rates are increasing[b]

4% *annually*  *2013-2014*

MVPD video margins are decreasing and there is every indication this trend will continue[a]

22% *2012*  **13%** *2015*

ACA members are losing video subscribers as cord cutting increases[b]

6% *annually* *2014-2015* 

As a result of their low, declining returns on a diminishing MVPD subscriber base and the uncertainty of their services' long term viability:

Most ACA members are not making substantial investments in their MVPD service.

Instead ACA members are investing primarily in their broadband business that benefits their ISP subscribers, especially those that consume video from over-the-top ("OTT") providers.

These "OTT video-enhancing" broadband investments include:

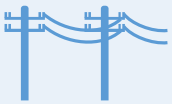
- Migrating Pay-TV service offerings still provided in analog to digital (i.e. going all digital)
- Joining OTT provider caching programs to optimize the OTT viewing experience
- Other plant capacity upgrades (e.g. node splitting) and increasing QAM channels for DOCSIS
- Deploying advanced set top boxes with better user interface (e.g. TiVo software enabled STBs) that:
  - Enable subscribers to access OTT content (e.g. Hulu) alongside their linear video service; and
  - Enable subscribers to conduct an integrated search of Pay-TV and OTT

Sources: a) SNL Kagan; b) ACA internal data and analysis

Cost of Compliance with Proposed Set Top Box Rules: Introduction

- To implement an information flows or "apps-based" solution,* MVPDs must simulcast their video service in all-IP
- For smaller MVPDs, launching an all-IP simulcast is a mammoth financial and operational challenge
- Actual costs will vary for each provider as different providers have vastly different network systems

Today's Focus

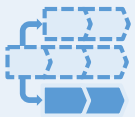


Plant Upgrade Costs – MVPDs will need to overhaul their networks from headend to household to support all-IP video delivery in parallel with RF video

IP Video Costs – MVPDs will need to purchase and deploy headend equipment that permits reliable delivery of their video service in all-IP

Operational Complexity – MVPDs will need to devote substantial effort and human resources to product management, software development, video engineering, business planning, plant construction labor, selecting vendors, and negotiating for programming rights

- *These complexities can be further limited by a shortage of fiber or other equipment, or plant construction vendors. Smaller MVPDs also typically do not have capital readily available to devote to a mandate of this magnitude and are limited in their ability to raise money from outside sources*



Opportunity Costs – MVPDs attention to simulcasting in all-IP would significantly impact their other lines of business, like broadband Internet access service, which will lose investments and focus

Proposal-Specific Costs – An information flows and an apps-based solution will each have additional unique costs

- *ACA estimates an information flows approach would incur costs similar to those of an apps-based solution, but ACA strongly believes the latter approach better serves the public interest*

Note: ACA notes that the NCTA/AT&T "apps" proposal exempts MVPDs with 1 million subscribers or fewer

Cost of Compliance with Proposed Set Top Box Rules: Direct Costs

- This presentation focuses on the direct financial costs for smaller MVPDs to simulcast their video service in all-IP

	Levers the Cost Component Is Based On:
Plant Upgrade Costs	
Plant Capacity Upgrades	% Systems Under 750 MHz; # of Households Passed
Analog Reclamation	# Subscribers Receiving Analog Service[1]
QAM Upgrades	# of Nodes
Headend Consolidation	Interconnected Headends; Fiber Availability
IP Video Costs	
National Transcoding	# End-State Master Headends[2]
Local Transcoding	# of DMAs; Avg. # of Local Channels Per DMA
IP VOD	# End-State Master Headends[2]
Metadata Server	One Per Operator
CDN	# End-State Master Headends[2]; # Subscribers
DRM Licensing	# Subscribers

Note: 1) "# of Subscribers Receiving Analog Service" refers to the number of subscribers receiving analog service that is simulcast over a digital system;
2) "# of End-State Master Headends" is referring to the number of master headends an operator will have after consolidating its headends and interconnecting its systems

Cost of Compliance with Proposed Set Top Box Rules: Unit Costs

Cost Component	Purpose	Cost Includes	Est. Cost	Unit	Levered To
Plant Capacity Upgrades	*Increase bandwidth*	Amplifiers to upgrade plant from < 750 MHz (minimum threshold for digital only system to support IP & RF) to ≥ 750 MHz	$4,000	*Per copper plant mile*	Plant Miles; % of Systems Under 750 MHz
	Node splitting	Split nodes to reduce capacity demand per node	$30,000	*Per node*	Households Passed/ Node; % Nodes Requiring Splitting
Analog Reclamation	*Deploy DTAs*	Deploy DTAs to legacy analog customers in order to reclaim channels for all-IP video transport	$112[1]	*Per subscriber receiving analog svc.*	# Subscribers Receiving Analog Service
QAM Upgrades	*Additional IP capacity*	CMTS equipment to add 16 QAM channels for DOCSIS for IP video transport	$3,000[2]	*Per node*	# Nodes
Headend Consolidation	*Consolidate to master headend(s)*	Lease fiber between systems and master headend(s)	$6,000	*Per system, Per month*	# Systems; Interconnected Headends; Fiber Availability
		or Build interconnection fiber. Average estimate 5 miles to nearest PoP, at rate of $50,000 per mile	$250k	*Per system*	# Systems; Interconnected Headends; Fiber Availability
	&				
	Fiber equipment	DWDM purchase, new builds only	$40,000	*Per system*	# Systems; Interconnected Headends
		& Transponders for all systems to be interconnected	$15,000	*Per system, per 10G wave*	# Systems; Interconnected Headends
National Transcoding	*Support national linear feeds*	All-IP transcoding, encryption, routing of national linear feeds. Cost may vary depending on codec used[3]	$7,000[2]	*Per national channel, Per headend*	# of End-State Master Headends
Local Transcoding	*Support local linear feeds*	All-IP transcoding, encryption, routing of local linear feeds, which are DMA specific. Cost may vary depending on codec used[3]	$7,000[2]	*Per local channel, per DMA*	# DMAs; Avg. # Local Channels per DMA
IP VoD	*Support IP VoD*	Transcoding and storage for VoD over all-IP	$300k[2]	*Per headend*	# of End-State Master Headends
Metadata Server	*Provide metadata*	Server to offer IP metadata for integrated search on third-party apps and devices	$35,000[2]	*Per operator*	None
CDN	*Optimize content delivery*	Origin/edge storage and delivery optimization infrastructure, fewer than 25,000 subscribers	$250k[2]	*Per headend*	# of End-State Master Headends; # Subscribers
		or Systems with greater than 25,000 subscribers	$500k[2]	*Per headend*	# of End-State Master Headends; # Subscribers
DRM Licensing	*Provide content security*	DRM licenses to secure content delivered over IP	$1[4]	*Per subscriber*	# Subscribers

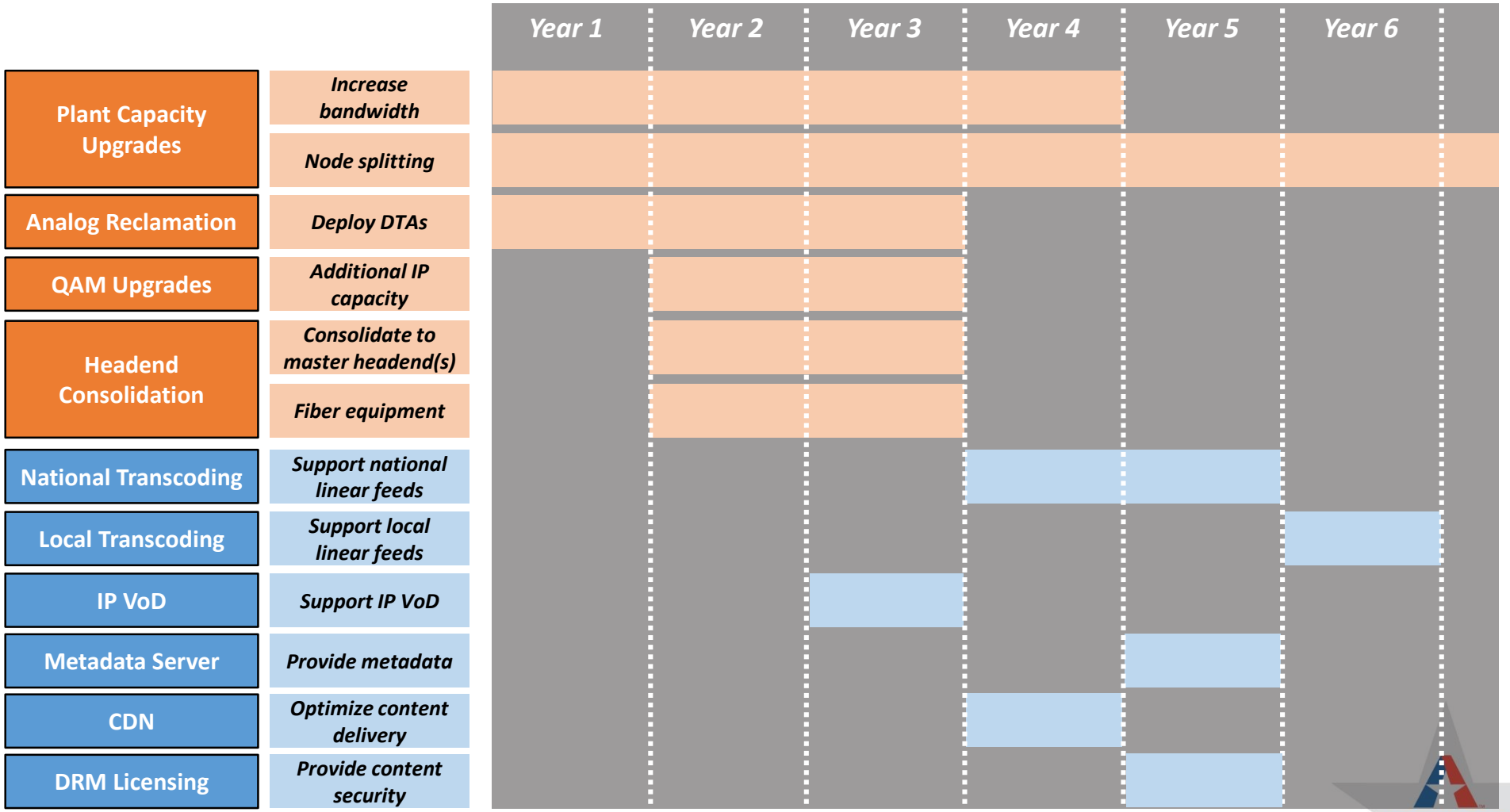
Note: 1) Fully loaded cost of a DTA is $56, which includes a $40 device cost, marketing and outreach costs of $5/subscriber, and installation costs of $30/truck roll for 35% of subscribers receiving DTAs – assumes operator provides 2 free DTAs; 2) Operators will also incur an ongoing annual 10% equipment maintenance cost paid to vendors for maintenance, support, and upgrade services; 3) ACA makes a conservative assumption that encrypting and transcoding content to MPEG4 in multiple, adaptive bit-rate formats will cost around $7,000/channel. Actual costs are likely to be as high as $10,000/channel; 4) Assumes $2.50/device DRM licensing costs, with 2 devices per subscriber, and that operators will initially purchase licenses for 20% of their subscriber base

Source: All cost estimates provided by small and mid-sized operators

Cost of Compliance with Proposed Set Top Box Rules: Operational Challenges

- The operational complexities associated with plant upgrades and simulcasting in all-IP means the timeline for such a project would require at least 4-6 years

Illustrative Operator's Timeline



Source: Based on conversations with ACA members

Cost of Compliance with Proposed Set Top Box Rules: Case Studies

- We have modeled four small and mid-sized MVPD archetypes

	Mid-Sized Urban MVPD	Suburban / Exurban MVPD	Suburban MVPD	Rural MVPD
# of Subscribers	145,000	213,000	53,000	15,500
Penetration[1]	20%[a]	30%[a]	36%[b]	36%[b]
# Households Passed	739,796	714,765	146,006	42,700
# Systems	10	32	5	2
# DMAs	10	32	5	2
# National Channels	300	300	300	300
Avg. # of Local Channels per DMA[2]	15	15	15	15
Plant Miles[3]	14,796	14,295	2,920	854
% of Systems Under 750 MHz[4]	4%[c]	27%[d]	21%[e]	50%
# Subscribers Receiving Analog Svc.[5]	0	51,115[c]	12,720[c]	3,720[c]
Interconnected Headends	Yes	No	No	No
# End-State Master Headend(s)	2	2	2	1
Fiber Availability	100%	80%	80%	50%
Households Passed/Node	300	500	500	500
# of Nodes	2,466	1,430	292	85
% of Nodes Requiring Splitting[6]	10%	20%	20%	20%

Notes: 1: Video service penetration – an operator's video subscribers as a percent of households passed; 2: Number of unique local channels carried per DMA served; 3: Based on average of 50 households passed per plant mile, Cartesian estimate driven by ACA member figures; 4: 750 MHz identified by ACA members as the minimum threshold to support simultaneous IP and QAM transmission; 5: Number of subscribers receiving analog service simulcast over a digital system; 6: Percentage of nodes which are too large for peak IP video demand to be supported by 16 QAM channels

Sources: a) SNL Kagan, taken from representative operators; b) Average penetration of ACA members; c) SNL Kagan, supported by historical ACA member figures; d) Representative ACA member estimate; e) National average of ACA members; *If not specified, Cartesian scenario-specific parameter.*

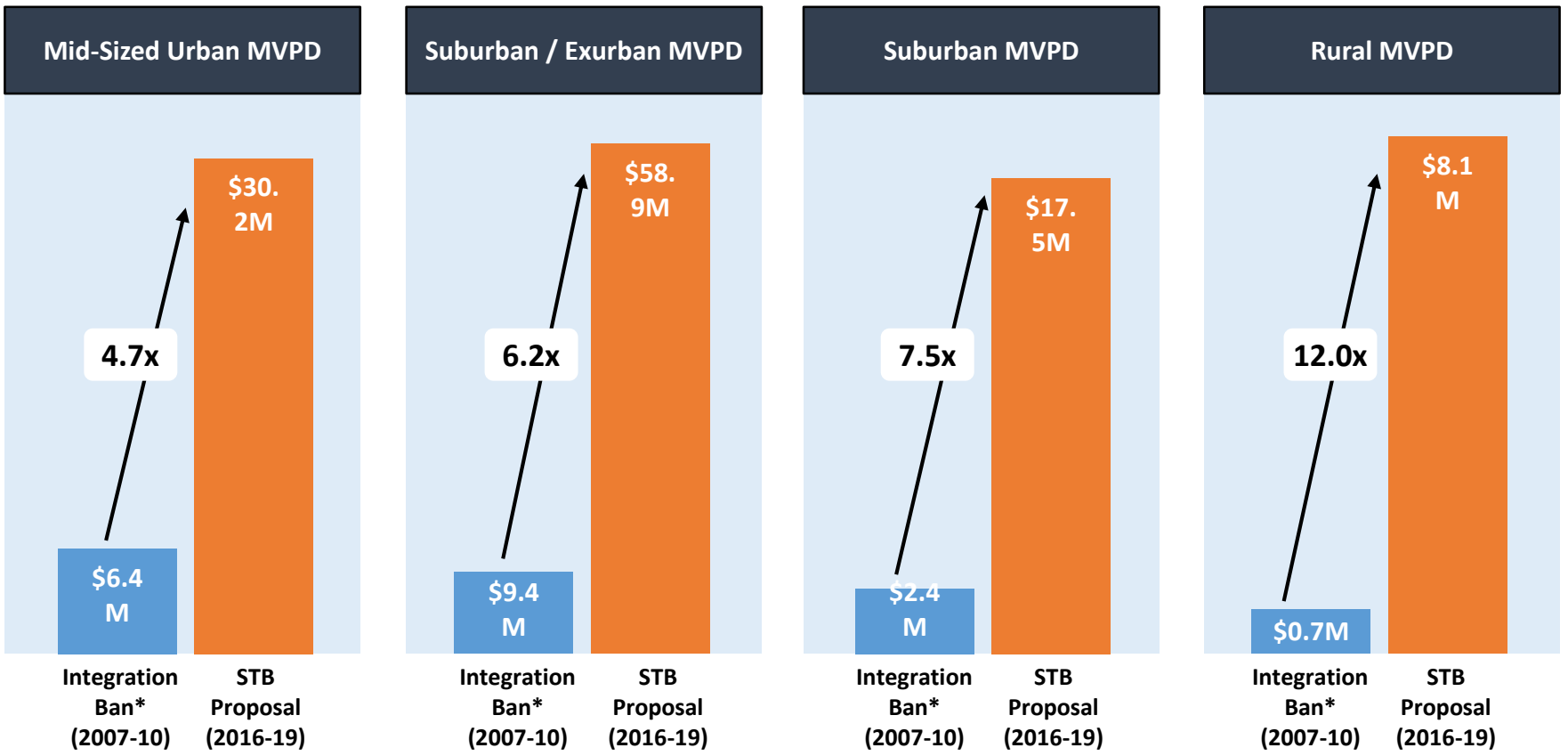
Cost of Compliance with Proposed Set Top Box Rules: Financial Impact

		Mid-Sized Urban MVPD	Suburban / Exurban MVPD	Suburban MVPD	Rural MVPD
Plant Capacity Upgrades	*Increase bandwidth*	$2.4 million	$15.4 million	$2.5 million	$1.7 million
	Node splitting	$7.4 million	$8.6 million	$1.8 million	$512,000
Analog Reclamation	*Deploy DTAs*	$0	$5.7 million	$1.4 million	$417,000
QAM Upgrades	*Additional IP capacity*	$7.4 million + $740,000/year	$4.3 million + $429,000/year	$876,000 + $88,000/year	$256,000 + $26,000/year
Headend Consolidation	*Consolidate to master headend(s)*	$0	$1.6 million + $1.8 million/year	$250,000 + $288,000/year	$250,000 + $72,000/year
	Fiber equipment	$0	$736,000	$115,000	$70,000
National Video Transcoding	*Support national linear feeds*	$4.2 million + $689,000/year*	$4.2 million + $920,000/year*	$4.2 million + $636,000/year*	$2.1 million + $315,000/year*
Local Video Transcoding	*Support local linear feeds*	$1.1 million	$3.4 million	$525,000	$210,000
IP VoD	*Support VoD*	$600,000	$600,000	$600,000	$300,000
Metadata Server	*Provide metadata*	$35,000	$35,000	$35,000	$35,000
CDN	*Optimize content delivery*	$1 million	$1 million	$1 million	$500,000
DRM Licensing	*Provide content security*	$145,000	$213,000	$53,000	$15,500
	Total Capex	***$24.4 million***	***$46.1 million***	***$13.4 million***	***$6.5 million***
	Total 4 Year Opex	***$5.8 million***	***$12.8 million***	***$4.1 million***	***$1.7 million***
	Total Cost	***$30.2 million***	***$58.9 million***	***$17.5million***	***$8.1 million***

Note: Includes ongoing annual equipment maintenance, support, and upgrade costs for all IP video delivery equipment (including local transcoders, IP VoD equipment, metadata server, and CDN)

Cost of Compliance with Proposed Set Top Box Rules: Old v. New

- Comparison of compliance cost of FCC's 2007 set-top box integration ban with FCC's proposed new rules



In 2007, video was the primary source of revenue and profits for MVPDs and so they were in far better position to afford compliance cost of set-top box integration ban

Note: Integration ban capex calculated over 4 years (2007-2010), and is the incremental cost of separable security STBs ($56) calculated using a 5-year STB replacement cycle

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